Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band	)	WT Docket No. 07-195
	)	
	)	
Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands	)	WT Docket No. 04-356

COMMENTS OF AT&T INC.

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SUMMARY

AT&T has grave technical and legal concerns regarding the AWS-3 and H Block proposals in the *Further Notice*. As an initial matter, AT&T believes that the proposed technical and operational rules will require substantial modification to avoid debilitating interference to adjacent AWS-1 and broadband PCS licensees. Moreover, as a result of the potential for significant interference under the currently proposed rules, significant legal issues also arise with respect to the impact on existing licensees' rights. AT&T also believes that the proposal to mandate free content-filtered broadband and open network access is a sharp reversal of consistent pro-competitive and deregulatory policies, exceeds the Commission's statutory authority, and would significantly devalue the utility of the AWS-3 band. For these reasons, AT&T believes modifications to the *Further Notice* proposals are necessary, and urges the Commission to revise the AWS-3 proposals consistent with these comments.

As an initial matter, the Commission must ensure that appropriate controls are adopted to prevent interference from potential uses of the H Block and AWS-3 spectrum bands into PCS spectrum and the AWS-1 band. The *Further Notice* proposals deviate substantially from Commission practices in allocating and authorizing spectrum by proposing the use of mobile transmitters in close spectral proximity to mobile receivers well after the auctioning of the spectrum rights associated with the incumbent operations. Neither PCS nor AWS-1 licensees were on notice that mobile transmitters would be permitted within spectrum adjacent to their licensed services. AT&T has consistently stated on the record that mobile-to-mobile interference, as presented by potential uses of the H Block and AWS-3 spectrum bands, requires significant technical limitations to be placed on new H Block and AWS-3 operations.

In particular, the empirical testing data and mobile wireless standards dictate that the H Block must be restricted to mobile transmit power of 13 dBm per carrier and the OOBE level allowed into the 1930-1990 MHz PCS band must be -66 dBm/MHz. AWS-3, as has been consistently demonstrated by wireless carriers and equipment providers, would be best utilized in a downlink only fashion. However, should the Commission adopt a structured uplink/downlink plan for AWS-3, with 10 MHz of spectral separation between AWS-1 and AWS-3 mobile operations, then AWS-3 mobile transmit power should be limited to 13 dBm per carrier and OOBE levels into the AWS-1 band should be restricted to -66 dBm/MHz.

Mitigation techniques to eliminate mobile-to-mobile interference are not workable – the only manner to eliminate mobile-to-mobile interference from H Block or AWS-3 operations is to restrict mobile transmit power and OOBE. Any reliance on past CMRS rules allowing for power and OOBE flexibility is inapt. The Commission has never attempted to place mobile transmitters in close spectral proximity to mobile receivers in the fashion contemplated by the *Further Notice* without providing significant interference protection to existing licensees that would be adversely affected. Indeed, given the gravity of the potential interference implicated by the proposed rules, adoption of the *Further Notice* proposals would constitute impermissible retroactive rulemaking and therefore be unlawful.

As a final matter, AT&T opposes imposition of free service requirements and open network access rules as unwarranted and unlawful. Both of these proposals sharply reverse years of pro-competitive, deregulatory FCC policies providing licensees with flexibility to meet market conditions. Not only will such rules unnecessarily restrict the utility of the spectrum for all potential applicants, the rules appear to tailored to the business model of a single entity—M2Z—whose plans are untested and, although being permissible under the existing regulatory

structures, have found no marketplace acceptance. AT&T submits that such actions would contravene both the Communications Act and the Administrative Procedures Act. Moreover, the open access limitations would severely undermine the public's recovery of the full value of the spectrum, since a similar proposal was shown to have resulted in significantly lower net bids in the 700 MHz auction even without accounting for the marketplace uncertainty engendered by the particular proposal in the *Further Notice*.

AT&T urges the Commission to adopt technical and operational rules for the AWS-3 and H Blocks that follow in the long and successful history of the mobile services. As the FCC has done in the past, the technical rules for these bands should provide protection for existing adjacent operations, and the marketplace should be the arbiter of the business plans that succeed or fail.

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AT&T Inc., on behalf of AT&T Mobility LLC and its wholly-owned and controlled wireless affiliates (collectively "AT&T") herewith files its comments on the Further Notice of Proposed Rulemaking in the above-captioned docket.[1] In its *Further Notice*, the Commission proposes technical and service rules for the Advanced Wireless Services ("AWS") spectrum at 1915-1920/1995-2000 MHz ("H Block") and 2155-2180 MHz ("AWS-3"). As AT&T discusses below, the *Further Notice* proposals depart significantly from prior policy in a number of respects and should be reconsidered. As an initial matter, the record in this proceeding is unequivocal that the technical rules proposed for H Block and AWS-3 operations would result in detrimental mobile-to-mobile interference to Broadband PCS and AWS-1 incumbents. Moreover, the proposals to encumber the band with "free" broadband and open access obligations reverse consistent policies favoring flexible, market-based regulation. Under the circumstances, AT&T strongly urges the Commission to reconsider the proposals in the *Further*

[1] *Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band*, Further Notice of Proposed Rulemaking, FCC 08-158 (2008) ("*Further Notice*").

Notice, and questions whether many of the proposed rules are even lawful under the Communications Act and the Administrative Procedures Act.

I. BROADBAND PCS AND AWS-1 INCUMBENT OPERATIONS MUST BE PROTECTED FROM INTERFERENCE FROM H BLOCK AND AWS-3 OPERATIONS

The Commission must ensure that appropriate controls are adopted to prevent interference from potential uses of the H Block and AWS-3 spectrum bands into Personal Communications Service ("PCS") spectrum and the 2110-2155 MHz band ("AWS-1"). The *Further Notice* has deviated substantially from Commission practices in allocating and authorizing spectrum in one key sense – it is allowing for the use of mobile transmitters in close spectral proximity to mobile receivers well after the auctioning of the spectrum rights associated with the incumbent operations. Neither PCS nor AWS-1 licensees were on notice that mobile transmitters would be permitted within spectrum adjacent to their licensed services. Indeed, the Commission itself noted that AWS-1 licensees were only on notice of TDD operations as of 2007, more than a year after the AWS-1 auction had completed.[2] PCS licensees were not made aware of the potential for H Block operations until 2004, more than 10 years after initial PCS licensing. AT&T has consistently stated on the record that mobile-to-mobile interference, as presented by potential uses of the H Block and AWS-3 spectrum bands, requires significant technical limitations to be placed on new H Block and AWS-3 operations. As discussed below, mobile-to-mobile interference has two main components – receiver overload/blocking and spurious emissions – that are of grave concern.

[2] *See Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band; Service Rules for Advanced Wireless Services in the 1915-1920 MHz, 1995-2000 MHz, 2020-2025 MHz and 2175-2180 MHz Bands*, Order, DA 08-1614 (2008) ("*AWS-2 and AWS-3 Extension Order*").

Receiver Overload/Blocking. A mobile receiver (operating in either the PCS or AWS-1 band) can suffer interference from an adjacent frequency mobile transmitter (such as proposed for the H Block and AWS-3 spectrum) even though the operations are outside of the PCS or AWS-1 receive band. As can be seen in *Figure 1* below (limited to showing the AWS case only for simplicity's sake), interference occurs because the mobile receive filter requires an amount of additional spectrum to effectively attenuate the adjacent band signal. This is precisely the reason that the Commission has generally provided for frequency separation between mobile transmitters and mobile receivers operating in a frequency division duplexing arrangement as is customary in the PCS band and is required by rules in the AWS-1 band. Limiting the power of the adjacent band interferer would also help mitigate interference as the interfering signal would not be strong enough to overwhelm the receive filters and/or introduce other receiver blocking interference mechanisms (*e.g.* intermodulation). In general, however, frequency separation between mobile devices is needed to eliminate interference between the competing transmit/receive operations.

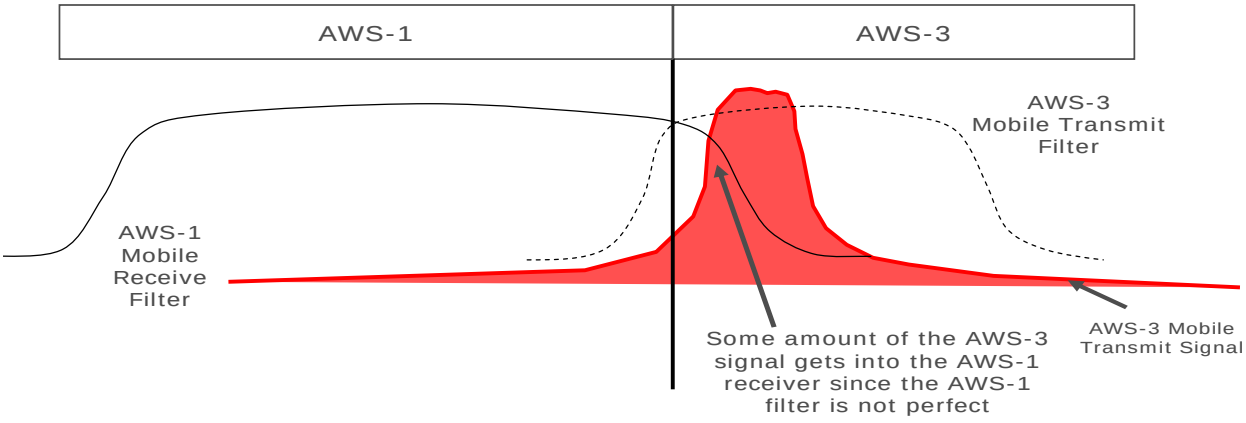

Figure 1: Overload/Receiver Blocking

Spurious Emissions or Out-of-Band Emissions ("OOBE"). Even if filtering is applied to the victim mobile PCS or AWS-1 receiver, additional in-band energy from adjacent band mobile transmit operations will be present and cannot be attenuated by PCS or AWS-1 receive filters.

Although H Block and AWS-3 mobile transmitters would have filtering, these devices will still produce some level of OOBE that fall into the PCS and AWS-1 mobile receivers. This OOBE issue is depicted in *Figure 2* below (again limited to AWS for simplicity).

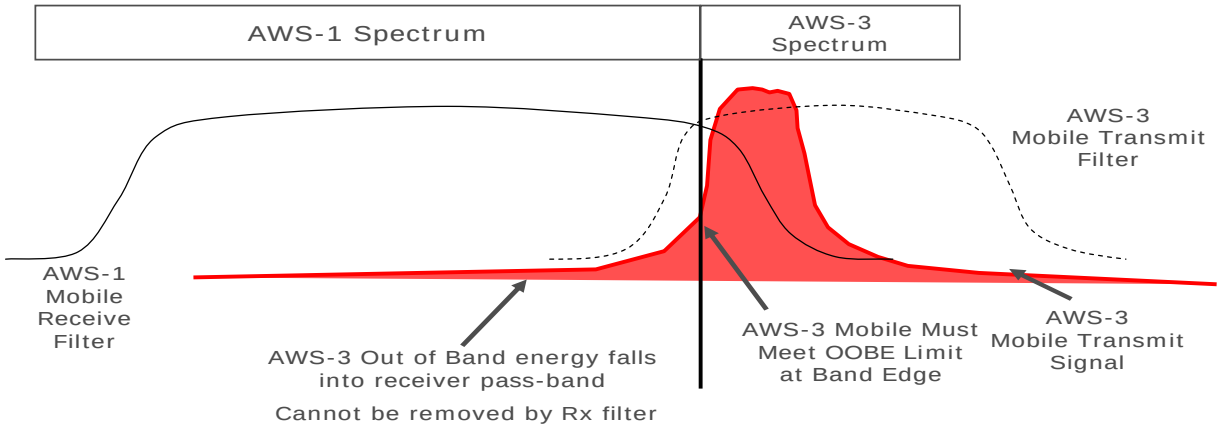

Figure 2: Out of Band Emissions from AWS-3 transmitter.

The technical rules for the H Block and AWS-3 cases, for which the Commission has sought additional comment, do not sufficiently account for receiver overload and blocking. And, as AT&T has previously discussed on the record, while a 10 MHz separation still exists between the upper edge of the H-Block at 1920 MHz and the mobile receive band at 1930 MHz, the H Block will still require more substantial OOBE limits coupled with restrictions on mobile power to protect adjacent band PCS licensees. In the case of AWS-3 rules, without the 10 MHz of guard band present in the H Block scenario, more stringent limitations would have to be applied to the AWS-3 spectrum to protect adjacent band AWS-1 operations.

A. The Commission's H Block Technical Proposals Are Insufficient To Protect PCS Operations.

The *Further Notice* proposes that H Block operators be required to: (i) attenuate OOBE by 43 + 10 log P (at the band edge) and 90 + 10 log P within the PCS band (1930-1990 MHz);

and (ii) limit mobile power to 23 dBm/MHz EIRP.[3] Additionally, the proposed rules indicate that the OOBE limits are to be measured in a 1 MHz resolution bandwidth or greater.[4]

Initially, AT&T notes that the mobile power limits suggested by the Commission have been provided in relation to 1 MHz, rather than as a total output power value. AT&T is uncertain if this proposal was unintentional or not, but moving from a 23 dBm total output power value to a 23 dBm/MHz peak EIRP requirement would greatly exacerbate the interference potential presented by an H Block interferer.[5] In any event, these suggested power and OOBE limits are insufficient to ensure the hundreds of millions of PCS handsets currently used by consumers are safe from harmful interference. Furthermore, even if the proposed limit is corrected to 23 dBm (and not based on power spectral density in terms of dBm/MHz), there is still significant risk of interference as has been shown in the exhaustive measurements and technical discussions already on the record in the H Block proceeding.

1. Independent Testing Has Conclusively Demonstrated The Interference Problems Raised by H Block Mobile Operations.

AT&T was supportive of CTIA's efforts to perform two separate independent tests that demonstrated conclusively the significant risk posed by H Block operations. The conclusions from these 2004 tests remain the same today:

- Receiver overload interference will be a serious issue for GSM, CDMA and UMTS PCS handsets that are located close to an H block handset, if the FCC's proposed 23 dBm/MHz (200 mW/MHz) power limit is adopted. Moreover, if the

[3] *See Further Notice* at 3.

[4] *See Id.* at Appendix A (§ 27.53(h)(4)).

[5] AT&T believed prior to this proposal that a UMTS carrier operating in 5 MHz of spectrum in the H Block would be limited to a total output power value of 23 dBm. Under the Commission's proposal of 23 dBm/MHz, a UMTS signal would be permitted to utilize a total output power of 30 dBm and still meet the Commission's limits, an increase of 7 dB over AT&T's prior understanding of the mobile power limits contemplated by the Commission.

Commission really intended to have a mobile power limit of 23 dBm per carrier, this power level would also create similar receiver overload interference concerns.

- Intermodulation interference is a serious issue for CDMA and UMTS PCS handsets, and is most serious at elevated temperatures.

- H Block mobiles' compliance with the industry standard 3GPP/UMTS OOBE limit of -66 dBm/MHz would largely prevent OOBE interference at a separation of 1 meter from PCS phones.[6]

Of note, the independent test results demonstrated that the characteristics of the duplexers in PCS handsets have dramatic differences over their normal operating temperature range.[7] With this variance in response to temperature shifts, it appears that PCS phones may be subject to overload interference from devices transmitting in any part of the H Block, not just the H Block channel closest to the PCS A Block at 1930 MHz (mobile receive).

The results of these tests should not be surprising – the filters in PCS handsets were not designed to provide overload protection from the H Block spectrum. The PCS handset receiver filters were designed to pass the upper PCS band (1930-1990 MHz) that is used for PCS base-to-mobile transmissions. Any signals in the PCS band (1850-1910 MHz) used for mobile-to-base transmissions were designed to be rejected. Thus, the handsets in consumers' hands were not designed to reject strong signals from nearby handset transmitters in the H Block.[8] The H Block is in the middle of the duplexer filter transition region, but the filter roll-off was not designed to reject strong signals from the H Block spectrum. The width of the overall pass band for PCS

[6] *See* Reply Comments of Cingular Wireless LLC, WT Dkt. No. 04-356, at 5 (filed Feb. 8, 2005) ("Cingular Reply"). While Cingular did not affirmatively support an OOBE limit in these reply comments, standards efforts that have continued in the intervening time have demonstrated that -66 dBm/MHz OOBE limits should adequately protect PCS devices.

[7] *See also* Ex Parte Communication of Agilent Technologies, ET Dkt. No. 00-258, at 6, 9 (filed Aug. 19, 2004) ("Agilent Filing").

[8] As AT&T has noted before, this is a one-way problem because H Block receivers will not have the same issue. H Block mobile receivers will be tuned to the 1995 to 2000 MHz band, which is located far from the bands used for PCS. *See* Cingular Reply at 4.

further exacerbates this problem. Since the desired pass band for the PCS mobile receiver is 60 MHz wide (1930-1990 MHz) or even wider if G Block is included, sharp filter response (*i.e.*, rapid attenuation of the interfering signal) in only 10 MHz of spectrum (if H Block transmissions are permitted) would be unachievable even in future handsets.[9]

2. H Block Interference Would Significantly Affect AT&T and Its PCS Customers.

The impact of H Block interference on the hundreds of millions of PCS customers will be considerable. Wireless customers have grown to depend on high quality mobile service for personal, commercial and emergency communications. Indeed, many of AT&T's wireless customers are public safety agencies, who rely upon AT&T's network for voice and data services. AT&T has invested billions of dollars to meet customer demands – the Commission should not undermine the service quality of these PCS systems which will have a significant adverse impact on members of the subscribing public.

H Block interference will manifest itself in lost calls, distorted audio quality, the inability to make or receive calls, the inability to determine location (including for E911 calls), and reduced data rates. Should the H Block licensee have widespread coverage and success in attracting customers, PCS carriers will be increasingly affected by diminished system capacity and coverage. Furthermore, as noted previously, the interference is solely from H Block mobile operations into PCS mobile receivers. Existing PCS devices will not interfere with H Block mobile receivers due to the greater separation between the PCS mobiles' transmit frequencies and the H Block mobiles' receive pass band so there will be little inducement for mutual cooperation between carriers to eliminate harmful interference.

[9] *See, e.g.*, Agilent Filing at 2 ("Agilent does not presently believe it can produce a single duplexer that would cover A through H blocks and meet -76 dBm/MHz OOBE.").

To adequately address the interference problem, new replacement filters would need to be developed and deployed in the hundreds of millions of PCS handsets currently in operation. AT&T believes that such filters would be difficult to develop, given the lack of frequency separation between base and mobile operations. However, should such an improved filter be technically feasible, it would only address receiver overload interference. It would do nothing to mitigate the in-band interference experienced by PCS handsets that would be produced by the OOBE from H Block mobile transmitters. Moreover, new filters would require the replacement of *every* PCS-capable handset in the marketplace today. With almost 260 million wireless subscribers,[10] the vast majority of whom have handsets that are PCS-capable, such a handset replacement program would take countless years, impose enormous costs and most importantly, would have a detrimental effect on consumers using PCS devices until such a conversion program was completed.

The more complex filtering necessary to protect against H Block mobile transmissions would significantly increase the size and cost of PCS phones. Additionally, the insertion loss within the filter pass band would also have to be increased due to the need to provide increased selectivity – resulting in larger, more expensive phones with less talk/standby time. In addition, PCS handsets are engineered to attempt to overcome added noise/interfering signals from H block transmissions by increasing their power levels – increasing the drain on the phone battery. All of these detriments to allowing H Block mobile operations at the power and OOBE limits suggested by the Commission would adversely affect PCS customers and carriers without any cognizable public benefit. The PCS industry and its consumers should not be required, in effect, to bear the cost of a new entrant's operation and harmful interference.

[10] *See* CTIA Wireless Quick Facts, *available at* http://www.ctia.org/advocacy/research/index.cfm/AID/10323 (last visited July 23, 2008).

Moreover, studies provided previously in the record demonstrate how significant a burden would be borne by PCS licensees. Even relatively low levels of interference can have significant effects on the service received by PCS customers. For example, in the past proceedings surrounding the use of the interference temperature metric, V-Comm provided a study of several scenarios that quantified harms to CDMA-based CMRS systems, should external interference increase the operating noise floor.[11] In particular, these models show that a rise in the noise floor of 0.33 dB would translate to a 5% capacity reduction (or a need for 5% more cell sites throughout the network to overcome the interference effects).[12]

3. H Block Interference Is Highly Probable.

As the CTIA tests results demonstrate conclusively, H Block operations near existing PCS customers will cause harmful interference. An H Block handset does not need to be actively engaged in a voice call or data connection to interfere with PCS operations, as all PCS devices engage in periodic background communications with base stations. One H Block mobile transmitter could interfere not only with a single PCS phone, but all PCS phones within several meters, depending on the maximum power level and OOBE limits established by the Commission. In a densely populated area, presumably there will be a corresponding increase in the number of H Block devices multiplying the interference effect to PCS handsets.

As AT&T has noted before, it is extremely common for wireless consumers in close proximity to use their devices at the same time.[13] While usage of wireless devices near one

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[11] *See* Comments of V-Comm, LLC, ET Dkt. No. 03-237, ET Dkt. No. 03-108, at 54-57 (filed Apr. 5, 2004) ("V-Comm Comments").

[12] *Id.*

[13] *See* Cingular Reply at 9. Examples include: (i) in car, bus or train; (ii) in an airport waiting room, a hotel lobby, or a meeting room; (iii) in the vicinity of schools or colleges; (iv) in the area surrounding a movie theater, ball game, concert, or other event; (v) in the stands of an outdoor event such as a sporting event or concert; and (vi) emergency events.

another is a frequent occurrence, the only method to protect PCS devices from H Block mobile operations is to maintain significant geographic separation.[14] The interference to PCS handsets will be especially evident when these conditions exist in rural areas because PCS devices would likely be receiving weak signals from a distant cell site, while the H Block device(s) would be transmitting at full power to reach a distant cell site.[15] For similar reasons, H Block interference would be magnified when multiple users are near one another indoors because of the weaker signals caused by in-building coverage attenuation.

4. The Commission Should Not Allow Mobile Services In The H Block Or Should Promulgate More Stringent Requirements On Power And OOBE.

As is true with the AWS-3 spectrum, AT&T believes the more prudent approach for the H Block spectrum is to not authorize it for mobile services. AT&T has suggested either fixed uses or potentially air-ground services may be more compatible with existing PCS operations.[16] However, the Commission has doggedly pursued the idea of permitting mobile services in the H Block, despite uniform and overwhelming opposition from existing PCS license holders and PCS equipment vendors. Should the Commission continue down this path, significantly more stringent constraints on H Block spectrum use must be adopted. AT&T is not aware of any party arguing for uniformly relaxed technical requirements on H Block operations – the sole proponent

[14] Sprint and Verizon Wireless, for example, have noted that a 23 dBm power limit proposed in the previous Commission NPRM would mean that "the H Block mobile device must not come within 26 feet (or 8 meters) of the PCS handset," and that the worst-case handset in the tests "demonstrated IM interference at a received H Block mobile device power level of -40 dBm, which occurs at 41 feet (or 12.5 meters) of an H Block mobile device operating at 23 dBm." *See* Joint Comments of Sprint Corporation and Verizon Wireless, WT Dkt. No. 04-356 at 12 (filed Dec. 8, 2004) ("Sprint/Verizon Wireless Comments").

[15] In rural areas, cell sites are more likely to be collocated, which would maximize the interference problem in areas where signal quality is marginal.

[16] *See* Cingular Reply at 10.

in 2004 had been Nextel, which has since modified its position to align with Sprint and Verizon Wireless, seeking tight OOBE limits and tiered mobile power limits for H Block operations.[17] As such, since the Commission has performed no H Block to PCS interference testing and has received no empirical technical data to support its *Further Notice* proposals, AT&T urges the Commission to reconsider its proposed technical restrictions to comport with independent test data findings supported by virtually all parties to this proceeding and which would protect PCS licensees and, most importantly, subscribers who rely on their services.

The empirical evidence provided to the Commission demonstrates that the following technical limitations are necessary:

- OOBE level allowed into the 1930-1990 MHz band of -66 dBm/MHz; and
- Mobile transmit power limit of 13 dBm across the entire H Block.

AT&T has previously described in great detail the formulation of these OOBE and mobile power limits, based on the data provided in the two independent testing studies commissioned by CTIA.[18] The only proponents who have a different mobile power and OOBE recommendation on the record, Verizon Wireless and Sprint, have sought even more stringent restrictions on the upper portion of the H Block.[19] Verizon Wireless and Sprint support mobile output power limits of 6 dBm in the 1917-1920 MHz band and 30 dBm in the 1915-1917 MHz band as well as

[17] *See, e.g.,* Joint Reply Comments of Sprint Corporation, Verizon Wireless and Nextel Communications, WT Dkt. No. 04-356 (filed Feb. 8, 2005). T-Mobile also has suggested on the record that its existing GSM devices in the PCS band would be protected by a mobile power limit of 23 dBm per carrier (measured on an average basis), but with more stringent OOBE limits (106 + 10 log (P)). *See, e.g.,* Comments of T-Mobile, WT Dkt. No. 04-356, at 7-10 (filed Dec. 8, 2004). T-Mobile did, however, note that CDMA and UMTS devices may require more protection. *Id.*

[18] *See* Cingular Reply at 13-19.

[19] *See, e.g.,* Letter from Donald C. Brittingham, Director – Wireless/Spectrum Policy, Verizon Wireless, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Dkt. No 04-356 (filed June 5, 2008).

OOBE limits of -76 dBm/MHz. As AT&T noted in its H Block reply comments, the mobile output power limits suggested by Verizon Wireless and Sprint are not technologically neutral and do not take into account the results from the CTIA WINLAB testing that shows that duplexers performance vary dramatically with temperature.[20] In addition, power limits that vary by frequency across the H Block will favor technologies employing narrower bandwidths, such as cdma2000, and unfavorably discriminate against wide-band technologies, such as W-CDMA (UMTS/HSPA).

As no commenter has offered more relaxed mobile power or OOBE limits for H Block licenses, nor has the Commission performed any testing or compiled its own independent data on this issue, AT&T strongly believes that the technical restrictions it proposes above are absolutely necessary, have not been refuted, are technically feasible, and should therefore be adopted to protect the hundreds of millions of PCS customers and devices in the marketplace.

B. Interference Protection of AWS-1 Licenses Requires Operational Restrictions on AWS-3.

AT&T similarly has grave interference concerns about the use of mobile transmitters in the AWS-3 spectrum adjacent to AWS-1 licensees. Indeed, the AWS-1 to AWS-3 interference case is more extreme than the H Block to PCS case and will exacerbate harmful interference for incumbents since the Commission has proposed absolutely no guard band between the two AWS spectrum bands. Inexplicably, the Commission has proposed significantly more *lenient* technical restrictions between these two incompatible spectrum uses. While proposing to maintain the same mobile power limit proposal of 23 dBm/MHz EIRP, the Commission inconceivably suggests that AWS-3 mobiles attenuate OOBE by 60 + 10 log P dB outside of the AWS-3 band

[20] *See* Cingular Reply at 17-19.

(and thus directly into the AWS-1 mobile receive band as explained previously).[21] These lax technical restrictions would allow interference into a large portion of the AWS-1 band, destroying the quality of service expected by consumers in the AWS-1 spectrum. AT&T urges the Commission to adopt OOBE and power limits that will fully protect incumbent AWS-1 operations and are more consistent with AT&T's proposals for the H Block.

1. AWS-1 Spectrum Should Not Be Compromised by AWS-3 Interference.

In establishing the service rules and holding the auction for AWS-1 spectrum in 2006, the Commission noted that:

> Our actions today bring us closer to our goals of achieving the universal availability of broadband access and increasing competition in the provision of such broadband services both in terms of the types of services offered and in the technologies utilized to provide those services. The wide spread deployment of broadband will bring new services to consumers, stimulate economic activity, improve national productivity, and advance many other objectives – such as improving education, and advancing economic opportunity for more Americans. By encouraging the growth and development of broadband, our actions today also foster the development of facilities-based competition. We achieve these objectives by taking a market-oriented approach to licensing this spectrum that provides greater certainty, minimal regulatory intervention, and leads to greater benefits to consumers.[22]

Moreover, at the close of the AWS-1 auction, Chairman Martin noted that:

> The first Advanced Wireless Services auction, which closed today, is the biggest, most successful wireless auction in the Commission's history. The spectrum offered was the largest amount of spectrum suitable for deploying wireless broadband ever made available in a single FCC auction. It grossed nearly $13.9 billion. I am particularly pleased that more than half of the

[21] *See Further Notice* at 2. Proposed Section 27.53(h)(4) would require compliance with this provision using a resolution bandwidth of 1 MHz or greater.

[22] *See Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands*, Report and Order, 18 FCC Rcd 25162, ¶ 2 (2003) ("*AWS-1 Service Rules Order*").

> winning bidders were small businesses. I hope many of these smaller companies will fulfill the promise of advanced wireless services in America's underserved and rural areas.[23]

The great success of the AWS-1 auction and the promise of this spectrum, as envisioned by the Commission, will be greatly undermined by the Commission's proposals for the AWS-3 band. AWS-1 spectrum, in AT&T's estimation, holds promise for the deployment of Long-Term Evolution ("LTE") technology – a fourth generation wireless broadband service to compete with DSL, cable and satellite broadband technologies. Hampering deployment in the AWS-1 band, where carriers have already begun implementation, with technical rules that virtually all parties agree will create harmful interference harms the public who could benefit from broadband 3G/3.5G services today[24] and 4G/LTE technology in the very near future.[25]

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[23] *See* Statement of Chairman Kevin J. Martin on the Conclusion of Advanced Wireless Service Auction (Sept, 18, 2006) *available at* http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-267473A1.doc.

[24] *See, e.g.*, T-Mobile USA Begins Commercial 3G Network Rollout (May 5, 2008), *available at* http://www.t-mobile.com/company/PressReleases_Article.aspx?assetName=Prs_Prs_20080505&title=T-Mobile%20USA%20Begins%20Commercial%203G%20Network%20Rollout (announcing T-Mobile launch of its 3G UMTS/HSPA network using AWS spectrum). *See also* Leap Launches First Advanced Wireless Services (AWS) Market with Full Capacity Retail and Network Introduction of Cricket Unlimited Wireless Service to Oklahoma City (Mar. 31, 2008), *available at* http://phx.corporate-ir.net/phoenix.zhtml?c=191722&p=irol-newsArticle&ID=1123363&highlight= (announcing Leap Wireless launch of AWS system launch in Oklahoma City).

[25] *See, e.g.*, LTE to cover much of 700 MHz band, but deployments still on horizon, RCR Wireless (April 3, 2008), *available at* http://www.rcrnews.com/apps/pbcs.dll/article?AID=/20080403/FREE/593443705&SearchID=73314648267632 ("AT&T will use the 700 MHz spectrum, as well as the AWS spectrum we acquired in the 2006 auction, for our 4G, LTE transition," said John Donovan, AT&T's CTO. "AT&T has broad coverage in these spectrum bands across 95% of the population. We have a contiguous band of 20 megahertz of spectrum for 4G, LTE transition across 82% of the population in the top 100 markets.").

2. The Lack Of Frequency Separation Between AWS-1 And AWS-3 Operations Renders The Interference Environment Incompatible With AWS-3 Mobile Operations.

In contrast to the H Block spectrum, the Commission's proposal has allotted absolutely no guard band between AWS-1 and AWS-3 operations. Yet, inexplicably, the Commission has proposed technical limitations on AWS-3 operations that are significantly more relaxed than those proposed to restrict the H Block. As the Commission has provided entirely no guidance on its rationale for the dichotomy between the AWS-3 and H Block OOBE limits, AT&T can only surmise the Commission expects that AWS-1 licensees will be required to restrict use of their AWS-1 spectrum to avoid the harmful interference permitted into their licensed band by AWS-3 mobile transmitters.

Possibly the Commission expects that improved AWS-1 filters can be developed and deployed, mitigating AWS-1 mobile receiver overload/blocking. However, the technical record, based on state of the art filtering technology and real-world testing data, does not support this belief. Avago Technologies (formerly Agilent), a leading manufacturer of the state of the art FBAR band pass filters and duplexers that are used to protect the pass band of AWS-1 mobile receivers, provided extensive technical comments on the capabilities of such filters.[26] Avago noted that signals in the "skirts" of these filters are only partially attenuated[27] and that filters require some finite spectrum to transition from pass band to reject band.[28] How steep the slope of the filter is (*i.e.,* how quickly the overload interference can be attenuated) is dependent upon:

[26] *See* Comments of Verizon Wireless, Attachment B -- "Some Comments on RF Filtering", by Avago Technologies, WT Dkt. No. 07-195 (filed Dec. 14, 2007) ("Avago Comments").

[27] *See Id.* at 6.

[28] *Id.*at 8.

(i) the filter element Q (higher is better)[29]; (ii) the filter architecture (more elements allows steeper drop off – but also increases insertion loss); (iii) filter bandwidth (narrower is better); and (iv) the frequency of operation (fewer Hertz are required at lower frequencies).[30] Additionally, these filters must contend with manufacturing tolerances and are susceptible to changes in temperature – the excursion (or total number of degrees between hot and cold) affects filter performance.[31]

When considering all these factors for the 2110-2155 MHz band, Avago opined that the approximate guard band necessary to protect AWS-1 operations from adjacent band mobile operations would be 13 MHz[32] – not 0 MHz as proposed by the Commission. Moreover, Avago noted that band pass filtering on the AWS-1 receivers would only eliminate interferers that are outside of the intended pass band – it would have no effect on in band, spurious emissions that must be filtered at the transmitter (in this case by AWS-3 mobile transmitter filters).[33] There is no technical information on the record by a vendor of mobile receiver filters that demonstrates that the conclusions reached by Avago are faulty or in any way incorrect. Given the lack of guard band between AWS-1 and AWS-3 operations, the technical record demonstrates that interference is highly likely and uncontrollable through any technologically feasible means for AWS-1 incumbents.

[29] Q is defined as the Quality Factor of a band pass or notch filter. It is defined as the center frequency of a filter divided by the bandwidth. The bandwidth is the frequency of the upper 3 dB roll-off point minus the frequency of the lower 3 dB roll-off point.

[30] Avago Comments at 8.

[31] *Id.* at 10.

[32] *Id.* at 14.

[33] *Id.* at 13.

In addition to the technical points made by Avago, Motorola and Verizon Wireless submitted data and analysis, including testing results that demonstrated that AWS-1 devices would be interfered with by AWS-3 mobile uplink devices even operating at extremely low power levels. Motorola performed internal experiments that show an AWS-3 mobile device operating at a power level of only 11 dBm (12.5 milliwatts) would result in an AWS-1 receiver call drop when the two devices were within 1 meter of one another.[34] Verizon Wireless, along with V-Comm, also analyzed the Motorola data as well as the H Block testing data submitted by CTIA. Verizon Wireless determined that "impairments to call quality" as described previously in CTIA's H Block testing and evaluation would occur at a much lower signal level of -42 dBm (0.063 milliwatts) and that this is a more appropriate benchmark for harmful interference.[35] Based on its analysis, Verizon Wireless asserted that AWS-3 mobile power should be restricted to 0 dBm (1 milliwatt) to protect AWS-1 devices.

Additionally, these same commenters demonstrated that OOBE, as expected, would also require significant attenuation. Motorola's testing resulted in a conclusion that: "mobile use in the AWS-3 band would require out-of-band emission restrictions greater than existing requirements expressed as 43 + 10 log(P) based on a requirement for 1 meter separation."[36] Motorola supported OOBE restrictions consistent with those recommended for H Block transmitters or -71 dBm/100 kHz (or -61 dBm/MHz).[37] Verizon Wireless also used the H Block

[34] *See* Comments of Motorola, Inc., WT Dkt. No. 07-195, at 5 (filed Dec. 14, 2007) ("Motorola Comments"). AT&T believes that the measure of a "dropped call" as the baseline for harmful interference is inconsistent with standards used for protection of wireless networks. Increases in frame error rate are a more accurate determination of harmful interference to a mobile device.

[35] *See* Comments of Verizon Wireless, WT Dkt. No. 07-195, at 12 (filed Dec. 14, 2007) ("Verizon Wireless Comments").

[36] *See* Motorola Comments at 7.

[37] *Id.* These recommended requirements were based solely on protection of GSM devices.

testing data to determine its recommendation that AWS-3 mobile OOBE limits be set at -75 dBm/MHz.[38]

The Commission's proposals in the *Further Notice* are significantly less stringent from both the transmit power and OOBE limits suggested by Motorola or Verizon Wireless. The 23 dBm/MHz EIRP limit suggested by the Commission, as demonstrated by the Motorola data and the H Block testing, would result in widespread AWS-1 mobile receiver overload/blocking. The 60 + 10 log(P) OOBE limit is 31 to 45 dB less stringent than the values suggested by Motorola and Verizon Wireless.[39] Moreover, the Commission's attenuation for the AWS-3 mobile transmitter filters is 30 dB less than what it has proposed for the H Block (or rather, the allowed OOBE limit is 30 dB higher). As the OOBE potential is even greater at AWS-1 than in the PCS band due to the lack of any spectral guard band between AWS-1 and AWS-3, the significantly more relaxed OOBE limits for AWS-3 have no basis in sound engineering principles nor in the technical record before the Commission.

AT&T believes that the proposed mobile power and OOBE limits for AWS-3 would result in pervasive interference to AWS-1 mobile operations. As noted in the H Block discussion above, interference between AWS-1 and AWS-3 devices would occur in many instances – and given the lack of guard band between AWS-1 and AWS-3 in the Commission's proposed technical rules for AWS-3, at even greater geographic separation distances.

[38] *See* Verizon Wireless Comments, Attachment A at 18.

[39] Motorola's proposed -61 dBm/MHz OOBE limit translates to 91 + 10 log P per MHz utilizing the Commission method of indicating OOBE. Verizon Wireless' proposed -75 dBm/MHz OOBE limit translates to 105 + 10 log P per MHz.

3. Mobile-to-mobile interference will be prevalent between AWS-3 and AWS-1.

Even M2Z (the most vocal proponent for TDD operations in the AWS-3 band) admits that "AWS-1 mobiles may encounter intermittent and highly probabilistic harmful interference occurrences from AWS-3 mobiles."[40] M2Z avers that the potential for harmful interference between AWS-3 and AWS-1 operations would be "rare" and "easily avoided." Additionally, M2Z argues that mitigation techniques can be used, such as: (i) base station siting; (ii) antenna polarization; (iii) adaptive antennas; (iv) transmitter/receiver improvements; (v) power control; (vi) mobile handover to other spectrum; (vii) intersystem frequency coordination; (viii) cognitive radio technology for interference control.[41] However, no details or further information on these strategies has been provided. Finally, M2Z argues that several unrelated events must occur simultaneously for mobile-to-mobile interference to occur: (i) operating close in space; (ii) operating far from base stations; (iii) operating close in frequency; and, (iv) overlapping in time.[42] Despite M2Z's best efforts to trivialize interference between proposed AWS-3 and AWS-1 operations, the empirical evidence provided to the Commission resoundingly refutes each of these claims. The fact remains that Commission adoption of the technical rules proposed for the AWS-3 band will result in frequent mobile-to-mobile interference which will not be able to be mitigated by incumbent AWS-1 licensees except through drastic reduction in the amount of spectrum AWS-1 licensees are able to use – spectrum usage rights which AWS-1 licensees won and paid for in 2006.

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[40] Letter from Uzoma Onyeije, M2Z Networks, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Dkt. No. 07-195, at 12 (filed July 2, 2008) ("M2Z July 2 Ex Parte").

[41] *Id.* at 15.

[42] *Id.* at 14.

Mobile-to-mobile interference mitigation. Although M2Z has failed to clearly define whether AWS-3 or AWS-1 entities would be required to utilize the "interference mitigation" techniques it has suggested, none of the supposed techniques are availing. Attacking mobile-to-mobile interference from the base station side of the equation (through siting, polarization and adaptive antennas) would have absolutely no effect on the out of band emission interference presented co-channel to AWS-1 mobile receivers. Should an AWS-3 mobile transmitter be located in proximity to an AWS-1 mobile receiver, the spurious emissions from the AWS-3 device will continue to spill over into the pass band of the AWS-1 receiver.

Base station mitigation techniques would also have little effect on receiver overload. Presuming that AWS-3 base stations were collocated with AWS-1 base stations and either type of antenna technique is utilized (or both), a strong AWS-3 mobile transmitter is likely to be located in areas where an AWS-1 mobile receiver is receiving a weakened receive signal. If anything, collocation would likely exacerbate this situation. While transmitter improvements or power control on the AWS-3 mobile transmitter will help improve the radio environment, AT&T believes that the empirical testing data, as well as information on state of the art filtering capabilities provided by Avago on the record, demonstrate that such improvements or controls will have limited effect on reducing either out of band emission or receiver overload interference.

M2Z has failed to clearly define what it means by "intersystem frequency coordination" but it is not a valid mitigation technique as AT&T assumes that M2Z is suggesting that this would require AWS-1 license holders to limit the use of their authorized, exclusive spectrum. Most modern commercial wireless networks are utilizing system frequency reuse factors of N=1 – the same frequency is used throughout the network. In past modulation schemes, where the

frequency reuse factor may have been N=3 up to N=7, there may have been an ability for a system operator to cease using a particular frequency within a cell. However, now for a party to mitigate interference via "intersystem frequency coordination," it would be required to stop use of portions of its authorized spectrum without any ability to reclaim this use. As such, AT&T strongly believes that this "mitigation technique" is infeasible.

Moreover, cognitive radio technology is in the nascent stages of development and cannot be relied upon by the Commission to protect AWS-1 license holders from harmful interference.

Most troubling of all is M2Z's contention that AWS-1 license holders could mitigate interference "by using their alternative frequencies when interference occurs."[43] As a factual matter, not all AWS-1 license holders have "alternative frequencies" to rely upon for mitigating interference from AWS-3 mobile operations. For example, MTA Communications, Inc. won the AWS-1 F Block (the spectrum block directly adjacent to the AWS-3 band) in REAG-7 covering Alaska.[44] While MTA Communications has some cellular spectrum in a single Cellular Market Area,[45] it does not have other CMRS spectrum holdings throughout its AWS-1 license area. Clearly, MTA Communications expected that its AWS-1 spectrum license grant would allow it to extend coverage throughout Alaska, without a need to "handover" to some other spectrum band for which it holds no license. There are many other AWS-1 licensees who are similarly situated to MTA– with no other spectrum alternatives at their disposal to provide service to their customers. Moreover, such an "interference mitigation" technique to require exclusively licensed AWS-1 licensees to "handover" to other spectrum bands is completely inconsistent with

[43] *See Id.* at 13.

[44] *See* http://wireless2.fcc.gov/UlsApp/UlsSearch/license.jsp?licKey=2867783.

[45] *See* http://wireless2.fcc.gov/UlsApp/UlsSearch/license.jsp?licKey=13004.

the license grants provided in 2006 and with the rights of primary licensee as well established in Commission precedent.[46] M2Z's outlandish claim that AWS-1 licensees, with exclusive spectrum license grants from the Commission, should be required to move to other spectrum bands in the face of interference from AWS-3 mobile operations clearly demonstrates that AWS-1 receivers would be subjected to repeated harmful interference and this type of operation should be flatly rejected by the Commission.

Likelihood of mobile-to-mobile interference. M2Z's attempts to trivialize the likelihood of AWS-1 and AWS-3 interference caused by close proximity of AWS-1 and AWS-3 mobile devices are also without merit.. The testing data provided by Motorola, as well as the follow on analysis of Verizon Wireless, has demonstrated that AWS-1 and AWS-3 mobiles do not need to be particularly close to one another to cause harmful interference. At the 23 dBm/MHz mobile power level proposed by the Commission, receiver overload interference could occur at distances much greater than 1 meter apart. For example, Verizon Wireless determined that AWS-3 mobiles would be required to be limited to 0 dBm in total output power to protect AWS-1 mobile receivers 1 meter away.[47] Should the Commission's proposal of 23 dBm/MHz be adopted, interference to AWS-1 mobile receivers would occur at least at 14.1 meters distant from AWS-3 mobile operations.[48] Additionally, interference is not restricted to cases far from base stations, and could arise in cases fairly close to base stations if there is any level of signal blockage to the mobile devices (for example, mobiles transmitting in-building or in a bus or train) that would

[46] *See, generally,* Section II.

[47] *See* Verizon Wireless Comments at 13.

[48] AT&T believes that this separation distance may in fact be greater than 14.1 meters because Verizon Wireless' analysis was based on a mobile total output power of 23 dBm. Adjusting this to the Commission's proposal of 23 dBm/MHz will likely increase the exclusion zone around AWS-3 mobile transmitters.

lead to lower receive signals for AWS-1 devices (and correspondingly high transmit powers for AWS-3 as they attempt to reach the blocked base station). As the MTA Communications example shows, the likelihood of AWS-1 and AWS-3 devices operating in close spectral proximity is dictated by the fact that certain AWS-1 operations will be limited to just the AWS-1 band close to AWS-3 – demonstrating that close frequency operations would occur often. Finally, the time parameter suggested by M2Z is also faulty – given the system characteristics of UMTS and CDMA (the technologies that have been deployed by AWS-1 licensees to date) – any AWS-3 mobile operation within an AWS-1 cell sector will have effect on the entire cell operation. This is true due to the fact that base station power is shared throughout the sector for these technologies. Thus, should a single AWS-1 mobile device experience interference within the sector, extra power would be provided to that AWS-1 device and adversely affect the capacity and operating parameters of the remaining AWS-1 devices within the cell.

In sum, AWS-3 to AWS-1 mobile-to-mobile interference is not limited in effect or scope. Absent any amount of guard band between uplink and downlink operations, OOBE and mobile power limit restrictions are the only effective means of ensuring that AWS-1 license holders will be fully protected from recurrent interference from AWS-3 mobile operations. While the Commission could seek to tighten the technical limitations it has proposed in the *Further Notice* to protect AWS-1, AT&T does not believe this would result in a feasible solution. As mobile wireless networks in the 2 GHz spectrum band are typically designed around average uplink power levels of approximately 24 dBm (250 milliwatts), practical deployment based on stringent power limits for AWS-3 is remote at best.

4. The AWS-3 Band Is Best Suited For Downlink Only Operations.

In light of the overwhelming technical information provided to the Commission and practical engineering realities, AT&T reiterates its position that the best use of the AWS-3 spectrum is for downlink only operations. While such limited use does not provide the full range of flexibility that is typically preferred or supported for CMRS licenses, AT&T notes that a downlink only allocation would allow for asymmetrical pairing with other AWS allocations to better support high data-rate Internet applications and at the same time avoid harmful interference to AWS-1 operations.[49] This requirement for downlink only operation is entirely consistent with the allocation for the 2110-2155 MHz band, which *is* reserved for downlink only operations.[50] Moreover, it is consistent with the asymmetric nature of broadband traffic. Downlink data rates and capacity requirements are much greater (content downloaded from the Internet) than are the requirements for uplinked data (content uploaded to the Internet). By allowing AWS-1 license holders or future AWS-2 license holders to obtain the AWS-3 spectrum that is reserved for downlink only operations, AWS-1 and AWS-2[51] licensees will be allowed to utilize greater capacity (and therefore data rates) for downlink operations.

Furthermore, a downlink only limitation would be fully consistent with the use of the entirety of the 2110 to 2200 MHz band. As noted, the 2110 to 2155 MHz band, assigned to AWS-1 license holders, is restricted to downlink only operations. Additionally, the 2180 to 2200

[49] AT&T also reiterates that, to the extent there is consideration in the future for transitioning the 1755-1775 MHz band from Federal government use to commercial use, that reservation of the 2155-2175 MHz band for pairing with the 1755-1775 MHz band would provide for optimal use of the spectrum.

[50] *See* 47 C.F.R. § 27.50(d).

[51] AWS-2 has been defined by the Commission to encompass the H Block as well as the J Block. The J Block consists of 5 MHz of spectrum (2020-2025 MHz) paired with another 5 MHz of spectrum (2175-2180 MHz).

MHz band is reserved for downlink only operations for the Mobile Satellite Service ("MSS").[52] As such, the Commission should attempt to rationalize the band plan for the 2110 to 2200 MHz band by ensuring that similar operations (downlink only) are adjacent to one another to mitigate interference and ensure the most efficient use of spectrum possible. Absent an appropriate use limitation, significant guard bands will be required between dissimilar operations – leading to inefficiencies in spectrum use. The Commission should therefore authorize the 2155 to 2180 MHz band solely for downlink only operations.

5. "Better" Filters Will Not Resolve AWS-3 Interference.

M2Z, among its many arguments, has repeatedly argued that the cause of interference detected by AWS-1 licensees in its testing is due to the use of band pass filters that allow energy from the 2155 to 2170 MHz band.[53] Verizon Wireless, among other AWS-1 license holders, has noted that international filters in commercial use stretch from 2110 to 2170 MHz.[54] These commercial filters have been developed to accommodate not only the United States market, but also markets in South America, Europe and Asia.[55] As 3G Americas has described to the Commission:

> Regardless of whether the product is built to operate across the internationally harmonized band or only across the U.S. band, it is not technically possibly today or in the foreseeable future to protect receivers in the 2110-2155 MHz band from an

[52] *See* 47 C.F.R. § 25.202(a)(4)(ii).

[53] *See, e.g.*, M2Z July 2 Ex Parte at 11. AT&T notes that for the first time, this ex parte appears to allege that the filters used by AWS-1 licensees have a pass band from 2110 to 2180 MHz. AT&T is unaware of any filters that stretch over this range.

[54] *See, e.g.*, Letter from Donald C. Brittingham, Director – Wireless/Spectrum Policy, Verizon Wireless, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Dkt. No. 07-195, V-Comm Attachment at 9 (filed February 19, 2008).

[55] *Id.*

> unacceptably high level of interference from immediately adjacent TDD operations in the 2155-2175 MHz band.[56]

The Commission's proposed AWS-3 rules would require carriers to redesign their entire AWS-1 networks and handsets to accommodate interference from yet-to-be-auctioned adjacent spectrum. This would include redesigning AWS-1 handsets with costly U.S. specific filters, a solution that still would not mitigate AWS-3 interference. This type of engineering will add to the costs of the devices and delay (or undermine ongoing) deployment with negative consequences for American consumers.

Consistent with the testing and technical filter information provided in the H Block context, and, more importantly, with the information delivered in the AWS-3 record, there is simply nothing an AWS-1 device can do to filter out OOBE from AWS-3 mobile transmitters. Band pass filters and duplexers are designed only to reject strong signals outside of the intended passband – they cannot possibly filter in-band interferers such as presented by OOBE.

Furthermore, even ideal AWS-1 band pass filters and duplexers are not physically capable of rejecting TDD mobile signals from AWS-3 licensees in adjacent spectrum bands. If such a "perfect" filter could be designed and deployed, AWS-1 licensees would be well-positioned to operate their systems without receiver overload concerns from AWS-3 mobile operations. However, the physical limitations of band pass filters and duplexers necessarily require more than 10 MHz of spectrum separation before having any effect on receiver overload interference.[57]

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[56] *See* Letter from Patricia Paoletta, Counsel to 3G Americas LLC, to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Dkt. No. 07-195, at 4 (filed June 25, 2008).

[57] *See* Avago Comments at 12.

M2Z has speciously focused on the use of band pass filters and duplexers that pass the 2110 to 2170 MHz band as the reason for harmful interference to AWS-1 operations. The technical record provided to the Commission has rebutted these arguments as completely baseless. AT&T notes that M2Z has not provided any technical information from a single manufacturer of such filters or duplexers that has indicated it could manufacture a product that would protect AWS-1 operations. As such, M2Z has failed to meet its burden of demonstrating that its proposed TDD operations in the AWS-3 band would fully protect incumbent AWS-1 licensees.

6. For Mobile Operations To Be Permitted in the AWS-3 Band, A Structured Band Plan With Significant Technical Limitations on Mobile Operations Is Required.

If the FCC, despite a technical record that has been unchallenged by any manufacturer of SAW or FBAR band pass filters or opposing testing data, decides to permit mobile operations in the AWS-3 band, the only possible alternative for consideration is a structured uplink/downlink model. AT&T reiterates its concerns about this approach as the Avago analysis clearly demonstrates that more than 10 MHz of spectral separation is required to protect AWS-1 operations.[58] However, some spectral separation between mobile operations would be preferable to none at all.

If a structured uplink/downlink plan is selected, AT&T recommends that the 2020-2025 MHz/2175-2180 MHz band ("J Block") be utilized to rationalize the band plan. The spectrum licenses could then be issued in the following manner: (i) 2155-2165 MHz (downlink only);

[58] This position is consistent with AT&T's position above, concerning H Block protections where it has been demonstrated that even a 10 MHz guard band is insufficient to protect PCS mobile receivers.

(ii) 2175-2180 MHz (downlink only); and (iii) 2165-2175 MHz (uplink/downlink).[59] The 2020-2025 MHz band could be paired as an uplink only addition to one or both of the downlink only spectrum licenses. Bidders for the 2155-2165 MHz and 2175-2180 MHz license blocks would understand prior to the auction that there would be a possibility of TDD operations in the 2165-2175 MHz band and could adjust their bids accordingly.

However, a structured uplink/downlink plan would not alleviate the need for more stringent mobile power and OOBE limits than those proposed by the FCC in the *Further Notice*. Indeed, AT&T believes that with 10 MHz of separation between AWS-1 mobile receivers and AWS-3 mobile transmitters, the same technical requirements needed between H Block and PCS devices would be applicable. Namely, mobile power should be limited to 13 dBm across the entire AWS-3 uplink/downlink block and OOBE limits of -66 dBm/MHz.

C. The 700 MHz Rules Do Not Provide Any Basis For Relaxed Technical Limits in the H Block or AWS-3.

M2Z has continually raised the 700 MHz commercial spectrum rules as a template for the lack of technical restrictions for the AWS-3 band.[60] However, this is a simplistic read of the Commission's policy and guidelines for the 700 MHz band, including mandatory duplexing requirements in the upper 700 MHz band to protect public safety operations. Another difference between AWS-3 and 700 MHz is that parties bidding in the 700 MHz auction were fully aware of the Commission's technical requirements and policies prior to the auction – requirements that were codified within the Commission's rules. As such, parties to the auction, thus fully

[59] If there is only to be 20 MHz for AWS-3 spectrum, AT&T recommends that the J Block be moved from 2175-2180 MHz to 2155-2160 MHz for downlink only operations. The remainder of the band plan would have 2160-2165 MHz for downlink only, 2165-2175 MHz would be uplink and downlink and 2175-2180 MHz would be downlink only.

[60] *See, e.g., Letter from Uzoma Onyeije, M2Z Networks, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission*, WT Dkt. No. 07-195 (filed June 17, 2008).

informed, were able to make rational decisions in choosing which spectrum licenses to value most highly and which to avoid.

In the 700 MHz band, the Commission adopted a band plan and technical rules that delicately balanced the needs of both public safety and commercial users. Specifically, as demonstrated in *Figure 3* below, the Commission established a one megahertz guard band between the public safety band and the C Block in the Upper 700 MHz band to help prevent C Block transmissions from causing receiver overload interference to public safety operations.

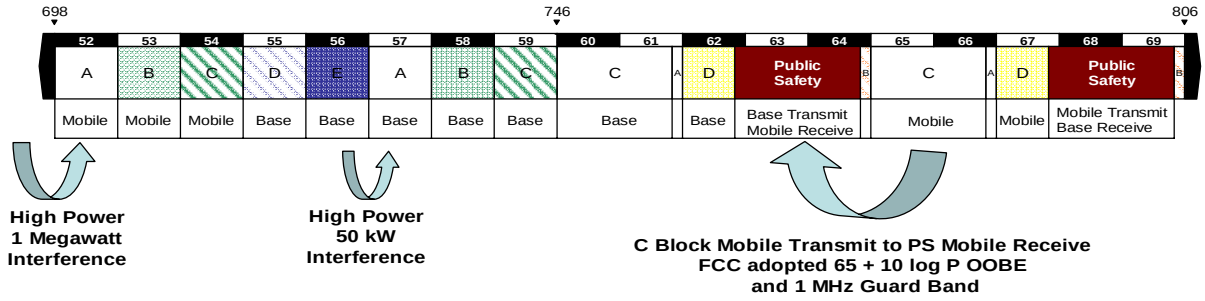

Figure 3: 700 MHz Band

The Commission also instituted a strict 76 + 10 log P OOBE for Upper 700 MHz C Block base stations and a 65 + 10 log P OOBE for Upper 700 MHz C Block mobile stations.[61] M2Z has argued that the mobile station OOBE limit into the public safety band is exactly the same as the standard OOBE limits placed in other spectrum bands.[62] This argument is incorrect for two reasons: (1) the Commission itself noted that this OOBE limit was tighter than the standard 43 + 10 log P limitation; and (2) the resolution bandwidth for the 700 MHz band is 100 kHz – not 1 MHz as presupposed by M2Z. When the Commission adopted the public safety OOBE limit requirements for the Upper 700 MHz band, it noted:

[61] *Service Rules for the 698-746, 747-762 and 777-792 MHz Bands*, Second Report and Order, FCC 07-132, ¶ 254 (2007) ("*700 MHz Service Rules Order*").

[62] *See, e.g.*¸ M2Z July 2 Ex Parte at 4.

> As noted above, based on the record, we are persuaded that we should adopt *an OOBE limit higher than 43 + 10 log P* in order to provide adequate protection to public safety.[63]

Clearly the Commission believed it was not adopting its standard OOBE limits for the public safety band, contrary to the beliefs of M2Z. Furthermore, extrapolation of the 700 MHz OOBE limits to a 1 MHz resolution bandwidth are also unavailing. Commercial 700 MHz licensees are required to use a resolution bandwidth of 100 kHz in measuring their OOBE compliance.[64] As the OOBE requirement for commercial 700 MHz licensees is 43 + 10 log P, this is equivalent to an OOBE limit of -13 dBm/100 kHz. The public safety limits for mobile OOBE, when looked at in reference to 100 kHz bandwidth, are -23 dBm/100 kHz – or 10 dB more stringent than the general limits for the commercial 700 MHz bands – and are in place to specifically protect the public safety receivers operating on 6.25 kHz channels as per the FCC's rules.

While the 700 MHz rules appear to have allowed for flexibility without stringent power and OOBE limits, the rules in place for incumbent public safety entities, combined with common sense and good engineering principles dictated the manner in which carriers would operate within that spectrum to minimize interference – especially mobile-to-mobile interference. The rules for the public safety spectrum in the Upper 700 MHz band expressly stipulate that the downlink for 700 MHz public safety is in the lower part of the Upper 700 MHz band and the public safety uplink is in the upper part of the Upper 700 MHz band.[65] This duplexing is opposite of conventional pairing and was done to align with 800 MHz public safety systems (and avoid mobile-to-mobile interference). With the public safety duplex directions set, the Upper

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[63] *See Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, First Report and Order, 15 FCC Rcd. 476, ¶105 (2000) (emphasis added).

[64] *See* 47 C.F.R. § 27.53(c)(5).

[65] *See* 47 C.F.R. § 90.531(a).

700 MHz band for commercial services in the upper C and D blocks must follow the same paradigm, especially given the 65 + 10 log P OOBE limits to protect public safety mobile receivers. In turn, the Lower 700 MHz duplexing direction must follow normal conventions to better align with the Upper 700 MHz band and to avoid interference concerns from high power TV stations below the Lower 700 MHz band. As such, even though the Commission did not dictate the duplexing direction of commercial operations in the 700 MHz band, TDD operations are effectively precluded by the 700 MHz public safety spectrum service rules.

In addition, even though the Commission's rules do not preclude TDD operations in the 700 MHz band, the standards for UMTS/HSPA and LTE developed in 3GPP and also cdma2000 standards have specified that in the paired blocks in the 700 MHz bands that FDD operation is assumed. In February 2007, well before the 700 MHz auction, AT&T (then Cingular) introduced the U.S. Upper and Lower 700 MHz bands for standardization in 3GPP. This proposal made clear that the lower and upper 700 MHz bands would use FDD and would use the duplexing direction dictated by the public safety spectrum in the upper 700 MHz band and a conventional duplex arrangement in the lower 700 MHz band.[66] Moreover, cdma2000 standards efforts were focused on FDD uses for the 700 MHz band as early as 2000.[67] These standards activities that predated the AWS-1 auction make clear that commercial wireless providers were proceeding into the auction with a full understanding that the commercial 700 MHz spectrum would be deployed in a standards-based FDD fashion – an outcome that is proving true in these spectrum bands.

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[66] *See, e.g.,* RAN4-070116, Overview of 700 MHz Band in the US. *See also* RAN4-070118, Work Item Description – UMTS in 700 MHz Bands (FDD), Cingular Wireless, 12-16 Feb. 2007, St. Louis, MO.

[67] *See, e.g.,* 3GPP2 C.S0002-A, Physical Layer Standard for cdma2000 Spread Spectrum Systems, Release A, June 9, 2000, *available at* http://www.3gpp2.org/public_html/specs/CS0002-A.pdf.

M2Z has attempted to argue that the WiMAX standards bodies have approved TDD use for the 700 MHz band.[68] However, the submission cited to by M2Z has never been approved by the WiMAX Forum – indeed, the 700 MHz band has no approved profiles in the WiMAX Forum.[69] Indeed, even the profile submission cited to by M2Z asserts that:

> [The submission for the 700 MHz band] …has to be considered as an initial proposal. Subdivision and reduction of these two profiles will probably have to be decided, based on technological constraints, and spectrum availability in various countries.[70]

The only standards that have been developed and approved accept the 700 MHz band to be available solely for FDD purposes in the United States.

Furthermore, in the Lower 700 MHz band, where the D and E block are unpaired 6 MHz blocks of spectrum, there were some concerns about interference to the Lower 700 MHz C Block.[71] Moreover, the high powered TV operations that remain in TV Channel 51 directly adjacent to the Lower 700 A Block also present significant interference concerns to potential bidders in the commercial 700 MHz auction. However, unlike the interference that may be caused to PCS and AWS-1 licensees suggested by the Commission's proposals in the *Further Notice*, potential Lower 700 MHz commercial licensees knew of the potential for interference in

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[68] *See, e.g.*, Letter from Uzoma Onyeije, M2Z Networks, Inc., to Marlene H. Dortch, Secretary, Federal Communications Commission, WT Dkt. No. 07-195, at 10 (filed March 19, 2008) ("M2Z March 19 Ex Parte").

[69] *See* "WiMAX Forum Mobile System Profile Release 1.0 Approved Specification (Revision 1.4.0: 2007-05-02) at 15-16; http://www.wimaxforum.org/technology/documents/wimax_forum_mobile_system_profile_v1_40.pdf.

[70] *See* M2Z March 19 Ex Parte at 10.

[71] Although interference to lower 700 MHz A Block licensees is possible, the likelihood of substantial, unavoidable interference is significantly less than from H Block to PCS and AWS-3 to AWS-1. In the 700 MHz band, the C Block uplink is directly adjacent to the D Block downlink. Base station receivers in the C Block therefore may receive some interference from the D Block. Base stations, however, may use much better filters than mobile stations, making interference less likely.

advance of the auction and was accounted for in applicants' bidding strategies. In addition, using the duplexing schemes for FDD systems as described above, the interference concerns are mostly related to base station-to-base station scenarios and, thus, present issues that an operator can better control as compared to the mobile-to-mobile scenarios present in the context of H Block and AWS-3.

To put this into context, Lower 700 MHz A and B Block licenses were subject to the same performance and licensing requirements. The only major difference between the two spectrum blocks was in the geographic area basis that they were licensed – the A Block was licensed on an Economic Area ("EA") basis and the B Block was licensed on a Cellular Market Area ("CMA") basis.[72] Past auctions have demonstrated that larger geographic area licenses tend to receive higher bids, when measured on a per megahertz-population basis.[73] However, 700 MHz auction bidders were able to appropriately apply an "interference discount" to the Lower 700 MHz A Block – the Lower 700 MHz A Block licenses garnered approximately $1.16/MHz-POP while similarly situated (from a regulatory perspective) Lower 700 MHz B Block licenses raised approximately $2.67/MHz-POP. While 700 MHz bidders were able to compensate for difficult interference rules, the Commission is proposing that PCS and AWS-1 license holders shoulder the cost of interference from H Block and AWS-3 mobile operations well after their respective auctions.[74]

AT&T strongly believes that the 700 MHz policies of the Commission should only be

[72] *See* Auction 73 Fact Sheet, *available at* http://wireless.fcc.gov/auctions/default.htm?job=auction_factsheet&id=73.

[73] For example, in the AWS-1 auction the 10 MHz REAG D Block license raised approximately $0.62/MHz-POP while the 10 MHz EA C Block license received approximately $0.52/MHz-POP. *See* http://wireless.fcc.gov/auctions/66/charts/66market.xls.

[74] Broadband PCS auctions were first held more than 14 years ago; the AWS-1 auction was initiated a little more than two years ago.

reviewed for application to the AWS-3 service rules in two respects – they allowed all parties to understand the technical rules associated with licenses (and apply a nearly 250 percent discount to certain spectrum licenses where interference was likely) and they properly required FDD pairing in the Upper 700 MHz band in accordance with protecting an incumbent user (in this case, public safety).[75]

This belief by the industry that the commercial 700 MHz band must use FDD technology is not without precedent. For example, the Commission's PCS rules also do not specify a duplex method or direction. Thus, while there is flexibility in the rules to allow TDD operations in the PCS band, this would certainly cause interference issues which would make that type of deployment extremely problematic if not impossible in any practical sense. Certainly, as can be seen in the US marketplace, common sense and sound engineering have concluded that FDD systems are the best approach for PCS regardless of whatever flexibility is allowed under the rules.

II. THE AWS-3 AND H BLOCK TECHNICAL RULES WILL INTERFERE WITH AT&T'S AWS AND PCS LICENSES IN VIOLATION OF ITS STATUTORY RIGHTS.

As noted above, if the Commission allows mobile transmissions in the 2155-2180 MHz band and in the H Block in the manner proposed, these transmissions would interfere with AWS-1 and PCS mobile communications, possibly to the extent of rendering certain license blocks unusable. Thus, AWS-1 licensees like AT&T – who previously purchased licenses in Auction

[75] Similarly, the AWS-1 rules also do not provide guidance for technical limits in accordance with M2Z's desires for TDD operations in the AWS-3 band. *See e.g.,* Comments of M2Z Networks, Inc., WT Dkt. No 07-195, at 40-41 (filed Dec. 14, 2007). As AT&T has noted, AWS-1 licensees must use the 2110 to 2155 MHz band for downlink only operations. The OOBE limits applied for the AWS-1 spectrum were derived with an expectation of the type of FDD use required by the Commission being extended to the AWS-3 spectrum, not requirements to protect adjacent TDD operations.

No. 66[76] – may experience some degree of harmful interference and may have to create the necessary frequency separation by moving their own AWS-1 base stations transmissions further away from the AWS-3 mobile band. This could, in effect, require AWS-1 licensees to cease using portions of their licensed spectrum, and would violate the statutory rights of AWS-1 licensees. Similar interference problems stemming from the operation of the H Block according to the proposed technical rules would affect PCS licensees, as noted above.

Specifically, the AWS-3 and H Block service rules proposed in the *Further Notice* effect an impermissible retroactive change in AT&T's existing AWS-1 and PCS licenses.[77] The Commission simply "cannot, in fairness, radically change the terms of an auction after the fact,"[78] as it would by adopting the service rules now under consideration. Indeed, AWS-3 and

[76] To the extent that the band plan and service rules adopted allow harmful interference to AWS-1 or PCS operations, the Commission may also violate the contractual relationship established when it concluded Auction No. 66 and the PCS auctions—specifically the implied covenant of good faith and fair dealing. The Commission's wireless licenses create "spectrum usage rights" that are "defined within the terms of the terms, conditions, and period of the license *at the time of issuance*." *Principles for Promoting the Efficient Use of Spectrum by Encouraging the Development of Secondary Markets*, Policy Statement, 15 FCC Rcd at 24178, ¶ 22 (2000) (emphasis added). Pursuant to these rights, the Commission typically takes great pains to protect incumbent licenses from any interference potentially generated by newly-licensed spectrum. For example, when the Commission established service rules for the AWS-1 licenses currently threatened by the proposed service rules, it established numerous procedures designed to protect co-channel and adjacent-channel incumbent operations from interference caused by the new licensees. *See AWS-1 Service Rules Order*. It also induced licensees to make substantial investment in their spectrum. Therefore, for the FCC to allow interference from adjacent-band operations to reduce the value of these licenses violates the contract rights created by the auction and relied upon by licensees.

[77] As the federal courts have recognized, an agency rule may be unlawfully retroactive in two respects: it may be "primarily retroactive" or "secondarily retroactive." *See, e.g., DIRECTV v. FCC*, 110 F.3d 816, 825-26 (D.C. Cir. 1997); *see also, e.g., Bergerco Canada v. U.S. Treasury Dep't*, 129 F.3d 189, 192 (D.C. Cir. 1997) ("[T]here are two retroactivity limits in the APA: The first is a categorical limit, requiring express congressional authority and applying only in the domain of agency rules. The second limit is more elastic, governing all agency decision making and involving the sort of balancing of competing values, both legal and economic, that often features in 'arbitrary or capricious' analysis and that has historically governed retroactivity considerations in the agency context.").

[78] *See U.S. AirWaves, Inc. v. FCC*, 232 F.3d 227, 235 (D.C. Cir. 2000).

H Block service rules that lack proper guards against interference in adjacent bands would fit squarely within the definition of primarily retroactive rulemaking.[79] Imposing such AWS-3 and H Block service rules would disrupt long-settled expectations of license holders in adjacent bands by "'impair[ing] rights [the] party possessed when . . . [it] acted,'"[80] "impos[ing] new duties with respect to transactions already completed,"[81] and "'alter[ing] the past legal consequences of past actions.'"[82] Bidders in Auction No. 66 and PCS auctions relied on the reasonable expectation that they would receive what they bid on – spectrum suitable for the provision of wireless services in the entirety of the band. The proposed service rules threaten to impair the rights possessed by bidders at the time that Auction No. 66 and the PCS auctions concluded.

Even if the service rules are not "primarily retroactive," they could be stricken as secondarily retroactive rules lacking adequate justification. Secondary retroactivity "occurs if an

[79] The interference resulting from the FCC's proposed service rules may also constitute a regulatory taking in violation of the Fifth Amendment. Specifically, if the interference resulting from AWS-3 or H Block transmissions becomes so severe as to make adjacent AWS-1 or PCS spectrum useless, the Commission's actions could rise to the level of a "*per se*" taking in violation of the Fifth Amendment. *See Loretto v. Teleprompter Manhattan CATV Corp*., 458 U.S. 419, 426 (1982). Government regulation that interferes with a property owner's "investment-backed expectations" by encumbering the property constitutes a regulatory taking. *See Penn Cent. Transp. Co. v. City of New York*, 438 U.S. 104, 124 (1978). The Supreme Court's regulatory takings inquiry focuses on the character of the government action, the economic impact of the government action, and reasonable investment-backed expectations. *Id.* Here, the proposed service rules may cause severe and harmful interference to PCS or AWS-1 licenses, have a substantial economic impact on PCS or AWS-1 licensees, and disrupt the reasonable, investment-backed expectations of PCS or AWS-1 licensees to the extent that the service rules violate the Fifth Amendment.

[80] *DIRECTV*, 110 F.3d at 825 (quoting *Landgraf v. USI Film Prods.*,, 511 U.S. 244, 280 (1994)).

[81] *Id.*

[82] *Mobile Relay Assocs. v. FCC*, 457 F.3d 1, 11 (D.C. Cir. 2006) (quoting *Bowen*, 488 U.S. at 219 (Scalia, J., concurring)); *accord Celtronix Telemetry, Inc. v. FCC*, 272 F.3d 585, 586 (D.C. Cir. 2001); *Bergerco*, 129 F.3d at 193; *Chadmoore Commc'ns, Inc. v. FCC*, 113 F.3d 235, 241 (D.C. Cir. 1997).

agency's rule affects a regulated entity's investment made in reliance on the regulatory status quo before the rule's promulgation."[83] The D.C. Circuit has found that secondary retroactivity "makes worthless substantial past investment incurred in reliance upon the prior rule."[84] AWS-1 and PCS licensees invested in their licenses in reliance on the regulatory scheme then in place, which did not indicate that licensees may be required to devote a portion of spectrum to create an internal guard band. When faced with a challenge to secondarily retroactive rules, the D.C. Circuit focuses its reasonableness inquiry on whether auction participants would have altered their bidding strategies in light of the newly imposed rules.[85] As it is likely that bidders in Auction No. 66 and the PCS auctions would have altered their bidding strategies had they known their spectrum would become so encumbered later, the Commission's actions are unlikely to clear the reasonableness hurdle.

III. THE PROPOSED AWS-3 SERVICE RULES ARE UNWARRANTED AND UNLAWFUL.

A. The Proposal to Regulate Wireless Broadband Rates and Other Terms of Service Is Unwarranted.

The Commission's proposed service rules for the AWS-3 band are overly restrictive and run afoul of the Commission's general deregulatory approach. Further, they will greatly undermine the value of the AWS-3 band, thwarting the Commission's objective of allowing "the most effective and efficient use of the spectrum in this band, while also encouraging

[83] *Mobile Relay*, 457 F.3d at 11. "This sort of retroactivity—characteristic of a rule having exclusively 'future effect' but affecting the desirability of past transactions—has become known as 'secondary retroactivity.' *Celtronix*, 272 F.3d at 589 (citing *Bowen*, 488 U.S. at 219-20 (Scalia, J., concurring)).

[84] *Bergerco*, 129 F.3d at 192-93 (quotation marks omitted).

[85] *See, e.g.*, *Celtronix*, 272 F.3d at 590 (determining that, in the context of a spectrum auction, a retroactive rule change was not arbitrary and capricious because bidders would not have altered their bidding strategy in light of the newly imposed rules).

development of robust wireless broadband services."[86] Given the success of the Commission's procompetitive policies in wireless and broadband markets, the proposal to micromanage wireless broadband rates and terms through overly restrictive service rules in the AWS III band is both unwise and unwarranted.

The great success of the wireless market, and the attendant benefits to U.S. consumers, is largely attributable to the deregulatory approach applied to such services – mandated by Congress[87] and deftly applied by the FCC – as well as the intense competition that regulatory regime has fostered among wireless carriers. The Commission has wisely and consistently pursued pro-competitive policies for CMRS offerings, and should continue to do so in this proceeding. By implementing a "more flexible, market-oriented model of spectrum allocation and assignment for spectrum used to provide commercial mobile services," the Commission's current policy of deregulation "affords licensees greater flexibility to decide what services to offer and what technologies to deploy . . . and allows market forces to play a greater role."[88] Indeed, the FCC has frequently noted the benefits of deregulation in recent service rules proceedings, finding that "[f]lexibility thus allows spectrum to move to its highest valued use

[86] *Service Rules for Advanced Wireless Services in the 2155-2175 MHz Band*, Notice of Proposed Rulemaking, 22 FCC Rcd 17035, ¶ 2 (2007).

[87] Congress has consistently and explicitly directed that a light regulatory touch be applied to competitive services. This deregulatory approach to commercial mobile radio services stems from Congress's enactment of the Omnibus Budget Reconciliation Act of 1993 (the "OBRA"), which amended the Communications Act with the "overarching congressional goal" of "promoting opportunities for economic forces – not regulation – to shape the development of the CMRS market." *Implementation of Sections 3(n) and 332 of the Communications Act*, Third Report and Order, 9 FCC Rcd 7988, 8012 (1994). Congress amended the Act to implement its "general preference in favor of reliance on market forces rather than regulation," and to permit the wireless market to develop subject only to that regulation "for which the Commission and the states demonstrate a clear-cut need." *Petition on Behalf of the State of Hawai, Public Utility Commission, for Authority To Extend Its Rate Regulation of Commercial Mobile Radio Services in the State of Hawaii*, Report and Order, 10 FCC Rcd 7872, ¶ 10 (1995).

[88] *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Twelfth Report, FCC 08-28, ¶ 73 (2008) ("*12th Annual CMRS Competition Report*").

without regulatory lag," and that flexibility "will spur investment in communication services and systems and technology development."[89] As a result of the deregulatory approach of Congress and the FCC, today's wireless marketplace is fiercely competitive, and U.S. consumers are the direct beneficiaries of that intense competition.[90]

The Commission's pro-competitive approach to wireless regulation has been a model of success, enhancing competition and innovation, and increasing use of wireless services while lowering costs to consumers. Now, without explanation or rational cause, the AWS-3 regulatory regime proposes to depart from this proven model and venture into the micromanagement of offerings, rates and marketing practices. By requiring "free" service, and so-called "open access" limitations, the proposed AWS-3 service rules are a radical departure from prior – and empirically successful – policies implemented by the FCC. These service rules will greatly impair AWS-3 spectrum – both technically and in terms of marketplace value – and prevent it from realizing its potential as a vehicle for innovative wireless services.

B. The Proposed License Condition Requiring Free Wireless Broadband Will Diminish the Value and Utility of the Spectrum.

The major AWS-3 license condition proposed by the Commission – a free, content-filtered wireless broadband network – should be rejected because of the condition's adverse impact on the spectrum's value and utility. As stated above, the Commission's policy of flexible, market-oriented regulation has led to highly productive use of wireless spectrum. The

[89] *AWS-1 Service Rules Order* at ¶¶ 13-14; *700 MHz Service Rules Order* at ¶ 200 ("The Commission generally relies on the competitive marketplace to deliver the benefits of choice, innovation and affordability to American consumers, and regulates only when market driven forces alone may not achieve broader social goals.").

[90] *12th Annual CMRS Competition Report* at ¶ 1 ("U.S. consumers continue to reap significant benefits – including low prices, new technologies, improved service quality, and choice among providers – from competition in the Commercial Mobile Radio Services ("CMRS") marketplace.").

free broadband proposal demonstrates how such heavy-handed regulation dramatically hinders the usefulness of spectrum.

Should the Commission require the AWS-3 licensee to provide a free broadband service, the licensee will necessarily be required to reduce the spectrum's potential in furtherance of this directive. The proposed license condition would require the licensee to devote 25 percent of its capacity to offer free broadband (at 768 kbs) subject to content filtering at the network level.[91] The licensee would need to offer premium services with broadband speeds on a for-profit basis with its remaining capacity to attempt to recover its spectrum and network build out costs. These conditions, which together with the technical rules discussed above, seemed tailored to fit the unique business model of M2Z, likely will dramatically reduce participation in the auction, rendering the "auction" more akin to an allocation of this spectrum to M2Z at a fraction of its market value.[92]

C. The Commission Will Run Afoul of the APA if it Imposes the Proposed "Free Broadband" Condition on the AWS Licenses.

Under the APA, a reviewing court must set aside agency action that is "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."[93] The APA requires that the record demonstrate the existence of an actual problem in need of a regulatory solution.[94]

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[91] The licensee would not be permitted to limit subscribership or usage to permit users of the free service to be assured of broadband speeds. *Further Notice* at Appendix A (§ 27.1191(b)(2)).

[92] Were there no "free broadband" restriction on the spectrum, M2Z would remain free to pursue its "free broadband" business plan should it emerge as the winning bidder. Accordingly, the requirement seems designed primarily as a means to effectively exclude all bidders with different business plans, ensuring that M2Z would obtain the spectrum at a small fraction of its market value.

[93] 5 U.S.C. § 706(2)(A).

[94] *See, e.g., Burlington Truck Lines, Inc. v. United States*, 371 U.S. 156, 168 (1962) ("The agency must make findings that support its decision, and those findings must be supported by substantial evidence.").

With respect to free service requirements, no record of any specific problem exists. Second, it would be arbitrary for the Commission to adopt any conditions and requirements without considering a less restrictive alternative means.[95] At a minimum, it would appear that the Commission's settled and well-reasoned policy of allowing market forces – rather than regulatory intervention – to drive the CMRS market would be a less restrictive alternative. Finally, the Commission has a duty under the APA to consider reasonable alternatives to its chosen policy and give a reasoned explanation for the rejection of these alternatives. To survive APA review, the Commission must therefore consider these "reasonably obvious alternative . . . rules, and explain its reasons for rejecting [them]."[96]

D. The FCC Lacks Statutory Authority to Adopt the Proposed Free Broadband Condition.

The FCC, like other federal agencies, "literally has no power to act . . . unless and until Congress confers powers upon it."[97] As discussed before, the imposition of the proposed free broadband condition on the wireless industry would conflict with Congress' clear direction in favor of market-based flexible regulations.

Beyond that, the FCC's power to adopt license conditions is also cabined by other Congressional limitations, principally 47 U.S.C. § 309(j)(3) which provides that "in specifying eligibility and other characteristics . . . of . . . licenses . . . the Commission shall . . . seek to promote" a number of goals and objectives. The proposed service rules contravene many of Section 309(j)(3)'s objectives:

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[95] *See, e.g.*, *Cincinnati Bell Tel. Co. v. FCC*, 69 F.3d 752, 761 (6th Cir. 1995) ("The FCC is required to give an explanation when it declines to adopt less restrictive measures in promulgating its rules.").

[96] *Telocator Network of Am. V. FCC*, 691 F.2d 525, 537 (D.C. Cir. 1982) (internal quotation marks omitted).

[97] *Louisiana Pub. Serv. Comm'n v. FCC*, 476 U.S. 355, 374 (1986)

- *First*, beyond plainly contradicting the objectives of Section 309(j)(3), the Commission would impermissibly cast aside Congress's expressly chosen mechanism for assigning valuable spectrum licenses. Should the Commission adopt service rules designed to favor one likely bidder – *i.e.*, by adopting with limited modification service rules that near-directly implement that bidder's proposal – it would turn the competitive mechanism on its head by creating a Government-favored competitor. Such action would render the impending AWS-3 spectrum auction little more than a formality, and reintroduce an element of regulatory fiat that was so much a part of the comparative licensing process (and, incidentally, that Section 309(j) was aimed to eliminate). The FCC previously declined to grant M2Z's earlier application without competition,[98] and the FCC should decline here to structure an "auction" to accomplish the same end.[99] The Commission simply cannot substitute its own judgment for the selection process mandated by Congress; where "Congress intended a specific scheme . . . [t]he Commission is not free to circumvent or ignore [or] in effect rewrite this statutory scheme on the basis of its own conception of the equities of a particular situation."[100]

- *Second*, Section 309(j)(3)(C) requires the Commission to promote "recovery for the public of a portion of the value of the public spectrum resource made available for commercial use and avoidance of unjust enrichment through the methods employed to award uses of that resource."[101] The proposed free broadband and open access conditions, however, are likely to substantially *reduce* the value of this spectrum, interfering with public recovery of the actual value of the spectrum. As demonstrated by the results of Auction No. 73 and as discussed above, restrictive service rules can

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[98] *Applications for License and Authority to Operate in the 2155-2175 MHz Band*, Order, 22 FCC Rcd 16563, ¶¶ 28-31 (2007).

[99] Indeed, adopting these rules would amount to granting a pioneer's preference, a scheme which Congress directed the Commission to abandon. The proposed free broadband and open access conditions would, if adopted, virtually ensure that the eventual auction winner secures the desired spectrum at a discount from true market value. Under the pioneer's preference program, the FCC formerly afforded preferential treatment in the licensing processes to "parties that made significant contributions to the development of a new spectrum-using service or a new technology that substantially enhanced an existing spectrum-using service." *Dismissal of All Pending Pioneer's Preference Requests; Review of the Pioneer's Preference Rules*, 12 FCC Rcd 14,006, ¶ 2 (1997). This policy "'effectively . . . guarantee[d]'" a license to an innovating party "'by permitting the recipient of a pioneer's preference to file a license application without being subject to competing applications.'" *Freeman Eng'g Assocs., Inc. v. FCC*, 103 F.3d 169, 174 (D.C. Cir. 1997) (quoting *Establishment of Procedures to Provide a Preference of Applicants Proposing an Allocation for New Servs.*, 6 FCC Rcd 3488, ¶ 32 (1991)). Congress unambiguously repealed the Commission's authority to award a pioneer's preference in 1997. Balanced Budget Act of 1997, Pub. L. 105-33, 111 Stat. 251 (1997) (moving up the expiration date of the pioneer's preference from September 30, 1998 to August 5, 1997).

[100] *MCI Telecomms. Inc. v. FCC*, 765 F.2d 1186 (D.C. Cir. 1985).

[101] 47 U.S.C. § 309(j)(3)(C).

substantially reduce the revenue generated from spectrum, both in comparison to the spectrum's reserve price and to similarly situated but unencumbered bands. The conditions proposed may allow the spectrum to be obtained at below market rates, unjustly enriching the winning bidder whose unique business plan is embraced by the agency to the detriment of others. This would violate Section 309(j)(3)(C) of the Act.

- *Third*, Section 309(j)(3)(D) requires the Commission to promote "efficient and intensive use of the electromagnetic spectrum."[102] The Commission has frequently noted that competitive bidding "ensures that spectrum licenses are assigned to those who place the highest value on the resource and will be suited to put the licenses to their most efficient use."[103] By imposing unnecessary regulatory requirements and reducing the value of the spectrum, however, the proposed conditions will interfere with the efficient allocation of spectrum promoted by license auctions, thereby resulting in less efficient use of spectrum.

- *Fourth*, the FCC is not empowered under Section 303(r) and Section 4(i) of the Act to impose free broadband conditions on the licenses. Under Section 303(r), the Commission lacks authority to impose license conditions if either: (i) imposing the conditions is "inconsistent with law"; or (ii) imposing the conditions is not "necessary to carry out the provisions of th[e] Act."[104] Likewise, the D.C. Circuit has stated that the FCC would lack Section 4(i) authority to impose a particular license condition if either: (i) any provision of the Act (expressly or implicitly) prohibited the Commission from imposing the condition; or (ii) the Commission could not reasonably conclude that the condition was "necessary and proper" to effectuate of the agency's enumerated powers.[105] Here, the FCC cannot meet its burden because the conditions are prohibited by a number of other statutory provisions and the Commission cannot show that the conditions are "necessary and proper" to effectuate any of the agency's enumerated authorities or powers. Indeed, it would be unreasonable for the Commission to assume that a "free broadband" condition was either necessary or proper in the context of a single spectrum auction, given the specific statutory guidance Congress has given to the Commission with regard to promoting broadband in Sections 254 of the Communications Act.

On this basis, AT&T submits that the proposed free broadband service rules cannot be imposed here consistent with the FCC's statutory authority.

[102] 47 U.S.C. § 309(j)(3)(D).

[103] *700 MHz Service Rules Order* at ¶ 235.

[104] 47 U.S.C. § 303(r).

[105] *Mobile Communications Corporation of America v. FCC*, 77 F.3d 1399 (D.C. Cir. 1996).

E. The Extension of So-Called "Open Access" Limitations to AWS-3 Spectrum Would Be Unlawful and Would Destroy Spectrum Value.

As discussed above, the Commission's policy of fostering competition in wireless and broadband markets has been a resounding success, resulting in demonstrable benefits to consumers. Despite the success of its deregulatory approach to wireless broadband, the Commission now proposes, in addition to regulating broadband rates in the AWS block, to extend a set of restrictive rules it previously determined to limit to a single block of spectrum in the 700 MHz block to additional spectrum. There is no evidence in the record to suggest that extending such restrictions would be in the public interest. Accordingly, the imposition of such restrictions on the AWS III spectrum would violate the APA.

Limiting the AWS licensee to an "open access only" model also would severely devalue the spectrum. In the case of the Upper 700 MHz C Block, the decision to displace market forces with a regulated "open access only" business model substantially reduced interest in the licenses and, ultimately, the value of the spectrum in the auction. Indeed, the C Block winner paid on average only $0.77 per "MHz/Pop" for its strictly encumbered C Block licenses; by contrast, the unencumbered A and B Block licenses fetched $1.16 and $2.67, respectively, per MHz/Pop.

Moreover, subjecting the AWS-3 spectrum to the "open access only" requirements that apply to the C block would create further uncertainty and confusion in the AWS-3 auction, which would further reduce the spectrum value. With regard to the C block requirements, there is currently a debate between Google and Verizon Wireless over their proper interpretation. Indeed, the issue was significant enough for Google to take the unusual step of petitioning the FCC to condition the grant of the C Block licenses on an acknowledgement by Verizon Wireless that Google's interpretation of the "open access" rules is correct. Tying the AWS-3 spectrum to the C block requirements would risk spreading such disputes over the C block requirements into

the AWS auction. Prospective bidders would likely be quite wary of the delays and complications sure to accompany any deployment of service under "open access only" limitations, as parties litigate over the proper interpretation and enforcement of the encumbrances. Such wariness will inevitably reduce the value of the spectrum.

Additional uncertainty about the "open access" encumbrances is raised in the *Further Notice* by the fact that some clear and unambiguous C Block restrictions do not appear in the *Further Notice*'s draft rules, despite the Commission's apparent intent to extend them to the AWS-3 spectrum. One of the two central features of the "open access only" encumbrances is a "no locking" rule: a licensee may not "disable features on handsets it provides to customers, to the extent such features are compliant with the licensee's" published technical standards, nor may a licensee "configure handsets it provides to prohibit use of such handsets on other providers' networks."[106] This provision, codified at 47 C.F.R. Section 27.16(e), is missing from the proposed rule.[107] The omission appears to be an error. The proposed "open access" rules in the *Further Notice* would apply to both the AWS-3 spectrum and the C Block, but the Commission could not lawfully modify the C Block rules in this manner without notice or comment.[108] Accordingly, it seems more likely that the Commission's intent was to include the "no locking" provision that appears in the current C Block rules in the *Further Notice*. Nevertheless, confusion over whether the proposed rules seek to encumber the AWS-3 licensee with some, but not all of the open access encumbrances that attached to the C block, would

[106] 47 C.F.R. § 27.16(e).

[107] Section 27.16(f), which allocates the burden of proof in the event of a dispute arising over the licensee's compliance with the open access encumbrances, also has been left out of the draft Rule 27.16.

[108] Such a revision of the C Block encumbrances, without notice or comment, would clearly violate the APA.

undoubtedly create additional confusion that would serve only to further depress auction proceeds.

IV. CONCLUSION

As AT&T has demonstrated, the *Further Notice* proposals depart significantly from prior Commission policy in a number of important respects. The record in this proceeding, in fact, clearly demonstrates that the technical rules proposed for H Block and AWS-3 operations would result in detrimental mobile-to-mobile interference to Broadband PCS and AWS-1 incumbents. In addition, the proposals to encumber the band with "free" broadband and open access obligations reverse consistent pro-competitive policies favoring flexible, market-based regulation. Under the circumstances, AT&T strongly urges the Commission to reconsider the proposals in the *Further Notice*, many of which would be unlawful under the Communications Act and the Administrative Procedures Act, and act consistent with these comments.

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